

## Young Children's Understanding of Fact Beliefs versus Value Beliefs

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FLAVELL, JOHN H.; FLAVELL, ELEANOR R.; GREEN, FRANCES L.; and MOSES, LOUIS J. *Young Children's Understanding of Fact Beliefs versus Value Beliefs*. CHILD DEVELOPMENT, 1990, 61, 915-928. Recent research on the development of children's knowledge about the mind has shown that young 3-year-olds have difficulty inferring that another person holds a false belief about a matter of verifiable fact, even when provided with considerable help. 4 studies tested the hypothesis that they would have less difficulty inferring that another person holds an odd, noncommemative belief about a matter of taste or value—one which, like the false fact belief, they themselves do not hold. On fact-belief tasks, an experimenter acted as if, or even explicitly stated that, she believed that the contents of a container were other than what the children knew to be the case. On value-belief tasks, she behaved as if she believed that a stimulus had a good or bad taste, smell, or appearance, whereas they thought it had the opposite. The results of all 4 studies confirmed the hypothesis.

Adults appear to use a folk or commonsense psychological theory in their efforts to understand and predict people's mental states and behaviors (e.g., Astington, Harris, & Olson, 1988; Churchland, 1986; Wellman, in press). A fundamental tenet of this theory is that beliefs and other mental states may differ between people and may fail to accord with reality. Thus, for example, adults understand that one person's belief concerning some state of affairs may differ from another person's, and that one or both of those beliefs could be false.

A number of researchers have recently been investigating the development of this and other components of our commonsense theory of mind (Astington et al., 1988). The concept of false belief has been of particular interest to these investigators. This is true both because of its central role in this commonsense theory and because the results of most studies suggest that, in contrast to 4- and 5-year-olds, 3-year-olds tend to find the concept surprisingly difficult to understand (Astington et al., 1988; Gopnik & Astington, 1988; Johnson & Maratsos, 1977; Moses &

Flavell, 1990, in this issue; Perner, Leekam, & Wimmer, 1987; Wimmer & Perner, 1983; for a more optimistic view of their understanding of false belief, see Bartsch & Wellman, 1989; Chandler, Fritz, & Hala, 1989).<sup>1</sup> A recent study by Moses and Flavell (1990, in this issue) shows how impoverished young children's understanding of false belief can appear to be. In this study, 3-year-olds were shown different versions of short videotapes in which an actor acquired a false belief by virtue of not having had perceptual access to a critical event. This is a variation on a well-known false-belief task used by Wimmer and Perner (1983). In one version, designed to make it very easy for children to infer a false belief, a girl named Cathy discovered some crayons in a bag. Then, leaving the crayons in the bag, she left the room, announcing that she was going to get some paper to draw on. While she was gone, a clown entered the room, hid the crayons in a drawer, and put rocks in the bag instead. Cathy then returned with the drawing paper, made directly for the bag, opened it, looked astonished, and exclaimed, "Hey, there are rocks in here!" The experimenter pointed out that Cathy was sur-

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<sup>1</sup>In his most recent writing on the subject, Wellman (in preparation) argues that although young 3-year-olds do possess a roughly accurate conception of beliefs as representational mental states, they assume that beliefs always faithfully copy reality, and therefore err on false-belief tasks.

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prised, rewound the videotape back to the point where Cathy was just about to look in the bag, and asked whether at that moment, back then, Cathy thought there were going to be crayons or rocks in the bag. Despite all these clues to Cathy's belief, 63% of the subjects incorrectly answered "rocks" (what they knew was there) rather than "crayons" (what Cathy erroneously believed was there). The percentage of incorrect responses was even higher (75%–87%) in the other, somewhat less facilitating versions of the false-belief task used in this study. A somewhat similar study by Hartl and Wimmer (1989) yielded parallel results.

Research on children's understanding of false belief has so far focused exclusively on matters of physical fact. However, people's beliefs or belief-like mental states vary on a rough "fact" to "value" dimension (Mansfield & Clinchy, 1985; Stevenson, 1963). At the "fact" end are beliefs about matters of physical fact that are clearly either true or false. For example, when in Moses and Flavell's study (1990, in this issue) Cathy thinks there are crayons in the bag and the child subject thinks there are rocks in it, it is a matter of demonstrable fact that Cathy's belief is false and the child's belief is true. Toward the "value" end of the dimension is an assortment of belief or belief-like states that have no clear and unequivocal truth or falsity; rather, we would tend to characterize them as matters of personal value, taste, preference, or opinion rather than as matters of hard, cold fact. To illustrate, what if, instead of differing about the contents of the bag, Cathy thought that a certain food was delicious tasting, a certain liquid unpleasant smelling, and a certain picture pretty, whereas the child subject believed them to have the opposite qualities? In this case we would hesitate to say that one person's belief was true and the other person's false, even after tasting, smelling, and looking at the objects ourselves. The appropriate verdict would be that there is no disputing tastes, rather than that one person's conviction was factually correct and the other's factually incorrect. There are also belief or belief-like states that fall at intermediate points on this dimension (Baier, 1958). For example, if two people disagreed as to which of two cars was the better buy, there would be much objective evidence to evaluate. In the end, experts might decide that one belief was clearly mistaken and the other clearly correct, given all the facts about the two cars, or they might have to decide that the two people's different wants and needs

regarding cars make it another case of *de gustibus non disputandum*. Similarly, people disagree on the extent to which moral positions should be regarded as matters of personal opinion or cultural prescription versus matters of fact and reason, and therefore subject to judgments of truth and falsity.

Beliefs from the "value-belief" end of the dimension share properties both with "fact beliefs" and with desires and preferences. To illustrate, Cathy's fact belief that there are crayons in the bag expresses a claim about the nature of the external world more obviously than it expresses a claim about the nature of her mental state. Her fact belief directs one's attention outward, toward the world, rather than inward, toward her mental state. In contrast, her desire (or her preference) for a certain food directs one's attention in the opposite direction. That is, it expresses a claim about her mental state more obviously than it expresses a claim about the nature of the food. Finally, her value belief that the food is delicious seems to be intermediate in these respects between fact belief and desire or preference. That is, it both expresses a claim about the nature of the food, namely, that it is delicious, and also conveys information about her mental state, namely, that she desires or prefers it. Thus, it is at least roughly accurate to say that fact beliefs mainly direct one's attention to the physical world, desires and preferences to the mental world, and value beliefs to both. Similarly, fact beliefs can be thought of as either true or false, desires and preferences as neither true nor false, and value beliefs as more like the one or more like the other in this respect, depending on where they fall on the fact-to-value dimension. These intuitions about the dual status of value beliefs are reflected in the philosophical literature in an ongoing debate as to whether value judgments are best characterized as beliefs, desires, or hybrid "besires" (see, e.g., Altham, 1986; Lewis, 1988; Platts, 1979).

As already indicated, there is much evidence that 3-year-olds often have difficulty crediting another person with a fact belief that differs from their own. What about value beliefs? There appears to be no direct evidence concerning the relative difficulty for young children of attributing to another person a fact belief different from their own versus a value belief different from their own. In what is probably the most relevant previous study, Mansfield and Clinchy (1985) presented children aged 3, 4, 7, and 10 with vignettes in which two people disagreed on matters of

verifiable fact, debatable fact, interpretation, and taste (of food) and asked them to speculate on possible origins and resolutions of the disagreements. They found that the preschool children tended to think that one person must be right and the other wrong, even in matters of taste, whereas the older children were likelier to accept the legitimacy of different beliefs, especially for patterns of interpretation and taste. However, this study did not test young children's willingness to attribute to other people either fact or value beliefs different from their own. Rather, it tested their ability to think about *de facto* belief differences between two other people that were presented to them as givens. A few other studies have investigated young children's understanding that different people may have different desires and preferences as regards, for example, birthday gifts, books, pictures, games, and foods (Astington & Gopnik, in press; Flavell, Botkin, Fry, Wright, & Jarvis, 1988; Gopnik & Seager, 1988; Hart & Goldin-Meadow, 1984; Higgins, Feldman, & Ruble, 1980; Nicholls & Thorikildsen, 1988; Shatz, 1978; Zahn-Waxler, Radke-Yarrow, & Brady-Smith, 1977). Some of these studies did not test children as young as 3 years of age, and those that did do not provide a clear picture of 3-year-olds' understanding of such differences. On some tasks, children of this age have been shown to perform fairly well; on others they have not, and the reasons for the different results are not clear.

However, there are at least three reasons to think that value-belief tasks might be easier for 3-year-olds than fact-belief tasks. First, we have just argued that thinking of value beliefs may direct our attention to the mental state of the believer more than thinking of fact beliefs does. If the same were true for young children, it might make value-belief tasks easier than fact-belief tasks. The reason is that, in order to understand that another person's belief might be different from one's own, one must realize that "belief" refers to a mental state, which can vary from person to person, rather than to the external world, which remains fixed. Thus, when young children are presented with a choice of value beliefs to attribute to another person, they may more readily understand that it is a description of the other person's mental state that is being asked for, not a description of the external world. Second, the mental states that value beliefs call attention to are desires and preferences, and these may be states about which young children are likely to be more knowledgeable than they are about beliefs. In sup-

port of this possibility, several theorists have recently argued that children acquire a rudimentary understanding of desire earlier than they acquire a rudimentary understanding of fact belief (Flavell, 1988; Ferguson & Gopnik, 1988; Fernald, 1988; Wellman, 1988, in press). Indeed, Wellman and Woolley (in press) have provided some experimental evidence for their hypothesis that children first acquire an elementary "desire psychology" and only later an elementary "belief-desire psychology" (see Wellman, in press). Third, discrepant fact beliefs can seem like profound disagreements about what object is actually present (e.g., crayons or rocks), whereas discrepant value beliefs sound like less profound disagreements about what the object that is present is like (e.g., delicious or not). It may be harder for young children to attribute to another person a more divergent-seeming fact belief than a less divergent-seeming value belief. In summary, there are three grounds for the hypothesis that 3-year-olds would find it easier to attribute value beliefs than fact beliefs to another person when these beliefs differ from their own: (a) thinking about value beliefs may more readily direct their attention to the believer's mental states; (b) these mental states are ones they already know something about—namely, desires and preferences; (c) the different beliefs may seem less different in the value case.

To test this hypothesis, we carried out three studies in which we directly compared 3-year-olds' ability to attribute to another person fact beliefs versus value beliefs that were different from their own, and a fourth in which we compared their ability to predict the person's behavior from knowledge of the person's fact versus value belief. The value beliefs variously concerned how substances tasted and smelled, and whether or not stimuli looked pretty or tasty. The same two experimenters participated in each study.

## Study 1

### METHOD

#### Subjects

The subjects were 32 nursery school children (19 girls, 13 boys) drawn from middle-class families. They ranged in age from 2-11 to 3-7, with a mean of 3-3. Two additional subjects refused to complete the procedure and were excluded from the study. Two female experimenters tested each subject: one did all the explaining and question asking; the other (Ellie) gave evidence of fact and value beliefs different from the child's.

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### Procedure

The session began with a very easy Level 1 visual perspective-taking problem to alert the subject to the possibility of subject-experimenter differences in perspective and to get the subject used to answering "yes" to some questions and "no" to others. A barrier was interposed between the subject and Ellie and a cup placed on Ellie's side of the barrier. The subject was asked whether he or she could see the cup and whether Ellie could see the cup. The barrier was removed and the same two questions were repeated. Each subject was then given two value-belief tasks and two fact-belief tasks. Half of the subjects were given value tasks before fact tasks, and half the reverse. The orders of the tasks within each pair were also counterbalanced. The children were also asked about preferences as well as value beliefs on value tasks, and about knowledge as well as fact beliefs on fact tasks; previous theory (e.g., Flavell, 1988) and research (e.g., Hogrefe, Wimmer, & Perner, 1986) suggested that preference and knowledge questions might prove easier than their value- and fact-belief counterparts.

*Value tasks.*—The stimuli for the two tasks were the subject's selection of his or her favorite cookie from a choice of three and a jar of unpleasant smelling liquid. For the taste task, Ellie behaved as though she disliked the taste of the cookie. For the smell task, she behaved as though she liked the smell of the liquid. On each task, the subject was asked whether he or she, and Ellie, liked the stimulus and whether he or she, and Ellie, thought the stimulus was yummy tasting (or nice-smelling stuff). Half the subjects were given "like" questions before "think" questions, and half the reverse. The subject's view was always asked for first for each question pair.

On the cookie task, after the child had selected a cookie, the first experimenter said: "That's my favorite too. I'll take a bite. Hmmm. It tastes delicious. Would you like to have a little bite? Does it taste good? Ellie hasn't had a chance to taste this cookie yet. Let's give her a taste. Are you hungry Ellie?" Ellie nodded yes and extended a paper plate. A small portion of the cookie was placed on the plate and Ellie tasted a tiny piece of the fragment. She shook her head in dissent, frowned, puckered her mouth, returned the fragment to the plate, covered it with another plate, pushed the plate away, and turned her back to the plate. The experimenter said: "You and Ellie both tasted the same cookie." Test questions were then whispered to the

child. The questions pairs were, "Did you like that cookie? Did Ellie like that cookie?" and "Do you think it is a yummy-tasting cookie? Does Ellie think it is a yummy-tasting cookie?" If the child was incorrect on his own perspective on the think question, he or she was asked, "Did you think it was a yummy-tasting cookie when you tasted it?" before Ellie's view was queried. On the cookie task, only one subject erred on his own view on the think question but was subsequently correct with this probe.

The smell task was similar in that after the first experimenter and the child agreed that the fluid did not smell good, Ellie behaved as though she liked the smell. Her behavior consisted of smelling the fluid, smiling broadly, taking a second long deep smell, dabbing some on her wrist, and smelling that. The opened jar was left near her as the test questions were asked. The test questions were: "Did you like that smell? Did Ellie like that smell?" and "Do you think it is nice-smelling stuff? Does Ellie think it is nice-smelling stuff?" Six subjects missed their own view on the think question, and four remained incorrect when asked, "Did you think it was nice-smelling stuff when you smelled it?" These four subjects were the only four subjects claiming to like the smell of the fluid. No subject claimed to dislike the taste of the cookie, and one of these refused to smell the fluid. These three subjects were questioned about the experimenter's and Ellie's perspectives, rather than about their own and Ellie's.

*Fact tasks.*—These tasks were structured such that the subject was in possession of knowledge about a state of affairs that a naive other (Ellie) was not. These tasks were different from traditional false belief tasks (but similar to the tasks used by Moses & Flavell, 1990, in this issue) in that the naive other gave strong behavioral and affective cues as to her false beliefs. By designing the fact tasks this way, we hoped to make them as easy as possible for children and somewhat comparable to the value tasks, which also contained behavioral and affective cues. On one task (candy), Ellie behaved as though a box actually containing candy was empty. On the other task (milk), she behaved as though an empty milk carton was full.

On the candy task, Ellie left the testing room as the experimenter showed the subject that, although candy was present in a candy box, it could not be seen. (The stimulus was a

two-layer box of chocolate mints, with the bottom layer containing mints and the top layer containing only empty candy papers and a barrier that occluded the sight of the candy below.) The experimenter said: "While Ellie is gone I have something to show you. This is a box of candy. [The candy was shown to the child.] I can put a special cover over the candy so we can't see it. Let's put the top of the box on too." Ellie returned. The experimenter asked: "Are you hungry Ellie?" Ellie responded "yes," looked at the candy box, licked her lips, picked up a paper plate and napkin from a corner of the room, opened the box, and searched unsuccessfully among the empty candy papers. Failing to find the candy, she pouted, shrugged her shoulders, sighed, shook her head, pushed the box away from her, and moved away from the table to return her plate and napkin. The pairs of whispered test questions were: "Do you know there is candy inside that box? Does Ellie know there is candy inside that box?" and "Do you think there is candy inside that box? Does Ellie think there is candy inside that box?" The subject's view was always asked for first for each question pair.

On the milk task, the experimenter displayed a full half pint of milk and said: "There's delicious milk in this carton. I'll pour a little in this glass. Are you thirsty Ellie?" Ellie licked her lips and said: "Yes, I'm thirsty. I'll go get a glass. I'll be right back." While Ellie was away from the testing room, the experimenter emptied the milk from the carton and placed the milk under the testing table. The subject was told: "While Ellie is gone, let's take all the milk out of this carton. There's no milk in this carton now. I've taken all the milk out." (The empty carton was shaken to demonstrate that all the milk was gone.) Ellie returned, glass in hand, and said: "I'm thirsty." She licked her lips and reached toward the milk carton. The experimenter said "Wait a minute Ellie" to freeze her actions, then whispered the following test questions: "Do you know the milk is all gone from that carton? Does Ellie know the milk is all gone from that carton?" and "Do you think there is milk inside that carton? Does Ellie think there is milk inside that carton?" Subjects given like before think questions on value tasks were given know questions before think questions on these fact tasks, and the reverse. There were no errors on either fact task on the know questions about the subject's own knowledge. However, six subjects erred in reporting their own perspective for the think questions on the milk task. Unlike

TABLE 1  
PERCENT CORRECT PAIRS OF ANSWERS TO  
FACT-BELIEF AND VALUE-BELIEF QUESTIONS

STUDY	TYPE OF BELIEF	
	Fact	Value
1 .....	31	69
2 .....	22	91
3 .....	33	53

the value tasks, these responses were not probed prior to asking for Ellie's perspective.

## RESULTS

The response measure analyzed was the number of pairs of questions correctly answered (range of 0-2), with a pair comprising the child's and Ellie's fact belief, value belief, knowledge, or preference (like-dislike). An example of a correct pair for value beliefs would be the child indicating that he or she thought the cookie was yummy tasting but that Ellie thought it was not. Preliminary analyses showed no significant effects for order of tasks or order of question types. There also were none for specific tasks within each task type, either in this or the following three studies. A 2 (type of task—fact vs. value)  $\times$  2 (type of question—fact or value belief vs. knowledge or preference) analysis of variance revealed a significant main effect for type of task,  $F(1,31) = 40.45, p < .001$ , and a near-significant main effect for type of question,  $F(1,31) = 3.87, p < .06$ ; there were no significant interactions. The percentages of pairs of questions correctly answered were 31% for fact beliefs, 69% for value beliefs, 36% for knowledge, and 77% for preferences (see Table 1).

Thus, consistent with previous theory and research, subjects may have been slightly better at inferring Ellie's knowledge than her fact beliefs, and also slightly better at inferring her preferences or likes-dislikes than her value beliefs. More important were the data on the belief questions. As predicted, subjects proved to be much better at attributing to Ellie eccentric value beliefs than false fact beliefs. As additional evidence for this conclusion, 18 of the 32 subjects performed better on value-belief questions than on fact-belief ones, 1 did the opposite, and 13 performed equally on both ( $p < .005$  by Sign Test).

## Study 2

The main purpose of Study 2 was to find out whether the fact- versus value-belief differences observed in Study 1 would still be found if 3-year-olds were explicitly told what Ellie knows or what she likes just prior to being asked what she thinks. Because what she believes depends on what she knows or what she likes, providing this information helps to equate the inferential demands of the two types of tasks. We also attempted to make fact tasks more comparable to value tasks in this second study by providing similar affective clues to Ellie's beliefs and asking belief questions about taste qualities of foods in both types of tasks. In addition, we replaced the yes-no question format of Study 1 with a forced-choice procedure in an attempt to eliminate any possible "yes" bias these young 3-year-olds might have. Unlike in Study 1, subjects were not permitted to actually taste any of the foods (necessitated by a change in nursery school policy). We anticipated that this constraint might make the value-belief tasks harder for the subjects by making their own perspectives less salient and accessible. Accordingly, we altered the tasks to stress the similarity of the first experimenter's and the subject's perspectives. Also, if a child was incorrect on his or her own perspective on a value task, Ellie's perspective was queried, and after that the first experimenter's.

## METHOD

*Subjects*

The subjects were 16 nursery school children (8 girls, 8 boys) from the same preschool used in Study 1. None of the children participated in Study 1. They ranged in age from 2;11 to 3;5, with a mean of 3;1. Two other children refused to complete the procedure and were excluded from the study.

*Procedure*

Each subject was given two value-belief tasks and two fact-belief tasks. Half of the subjects (four girls and four boys) were given value tasks before fact tasks, and half the reverse. The orders of the tasks within each task type were also counterbalanced. As in Study 1, subjects were given a Level 1 visual perspective-taking experience as a warm-up prior to their first task.

*Value tasks.*—On one value task, salt was poured into a glass of orange juice to create a bad-tasting liquid. On the other value task, a pinch of sugar was added to apple juice to create a good-tasting liquid. The second experimenter (Ellie) behaved as though she liked the salty orange juice and disliked the

nice apple juice. The procedure will be illustrated for the salty orange juice task. The experimenter said: "Here is some orange juice. I'll put a whole lot of salt in here so it will taste *bad*." The first experimenter, using a spoon, tasted it and continued: "This salty orange juice tastes *awful*. I'll bet you don't like the taste of this salty orange juice. I don't like it either. It tastes *bad*. Let's give Ellie a chance to taste it." Ellie tasted the juice, smiled, nodded her head, licked her lips, and said: "Hmmm. I'll go get a glass so I can have some more of that." While Ellie was away from the room the first experimenter gave the following information about preferences: "You and I *don't* like the taste of this salty orange juice. [The experimenter shook her head.] *Ellie* likes the taste of this salty orange juice. [The experimenter nodded her head.] Then Ellie returned, empty glass in hand, and was asked: "Do you want a taste?" Ellie responded "yes" and began to reach for the glass of orange juice until her action was halted by the first experimenter saying, "Wait a minute Ellie." The following test questions were then whispered to the child, always in this order: "What do you think about this orange juice? Do you think it is yummy tasting or yucky tasting? What does Ellie think about this orange juice? Does she think it is yummy tasting or yucky tasting? What do I think about this orange juice? Do I think it is yummy tasting or yucky tasting?" (Recall that this third question was asked only when the subject was "incorrect" on his own view. There were 10 such errors on value tasks out of a possible 32 instances, with eight subjects making at least one error. However, correct responses to the question about the first experimenter's view were subsequently given in eight of these 10 instances.)

The apple juice task was structured similarly. Ellie's tasting behavior toward the nice-tasting juice consisted of frowning, shaking her head, pursing her lips, and pushing the juice away. She said: "I'll go get some water to wash that taste away." When she returned to the room she was offered a taste, replied "no," and turned her back to the stimulus.

*Fact tasks.*—On one of these tasks a good-tasting food (cake) was replaced in Ellie's absence with a bad-tasting food (dry cat food), the cat food was covered with a dish cloth, and the child was told that he or she and the experimenter knew what was under the cloth but that Ellie did not. Ellie returned to the room and behaved as though she wanted to eat the covered food, and then the child was questioned as to what sort of food he or she and Ellie thought was present. On

the other task, a bad-tasting food (burnt toast) was replaced with a good-tasting food (a cookie). The procedure will be illustrated in full for the cake task. The first experimenter said: "Here is some cake that tastes good. [She tasted the cake.] This cake tastes delicious. I'll bet you like the taste of this kind of cake. [On the few occasions when a child disagreed, the experimenter repeated the procedure with a food the child did like.] I like it too. It tastes good. Let's give Ellie a taste." Ellie acted as though she liked the cake, exhibiting behaviors and verbalizations identical to those in the salty orange juice task, except that she left to get a plate rather than a glass. While Ellie was out of the room, the first experimenter said: "While Ellie is gone I'll take the cake away [the cake was placed out of sight] and put some cat food here instead. The cat food tastes awful. [The cat food was not tasted, although the cookie on the second fact task was.] I'll bet you don't like the taste of cat food. I don't like it either. It tastes bad. Let's cover the cat food up. You and I know what is under here. We took away the cake and put cat food under here instead. [The experimenter nodded her head.] Ellie doesn't know what is under here. [The experimenter shook her head.]" Ellie returned, plate in hand, and was asked: "Do you want a taste?" She said "yes" and extended her arm and the plate toward the covered dish. The experimenter said "Wait a minute Ellie" and then whispered, in fixed order, the two test questions to the child: "What do you think [does Ellie think] is under here? [The experimenter pointed to the covered dish.] Do you think [does Ellie think] there is yummy-tasting cake or yucky-tasting cat food under here?"

The burnt toast task was structurally the same. Ellie acted as though she disliked the toast, using the same behaviors exhibited on the apple juice task, and upon returning to the experimental room after the substitution of a cookie had been made, refused a taste and turned her back to the covered dish. The response options for this task were "a yummy-tasting cookie" versus "yucky-tasting toast." Response options within questions were counterbalanced for both fact and value tasks, with half the subjects given "yummy" options before "yucky" options for all four tasks, and half of the subjects the reverse.

## RESULTS

Subjects responded completely correctly to the questions about their own and Ellie's value beliefs on 21 or 66% of the 32 trials on which this pair of questions was asked (16

subjects  $\times$  2 value tasks). On eight additional trials (25%) subjects responded "incorrectly" to the question about their own value belief but then correctly differentiated Ellie's and the first experimenter's value beliefs, making a total of 29 (91%) value trials that were basically correct. In contrast, they responded correctly on only seven or 22% of the 32 fact-belief trials (see Table 1). A 2 (type of task)  $\times$  2 (order of task type)  $\times$  2 (sex) analysis of variance performed on "basically correct pairs" (i.e., including the eight as well as the 21) revealed significant main effects for type of task,  $F(1,12) = 55.85, p < .001$ , and order,  $F(1,12) = 11.54, p < .005$ . The main effect of task, but not that of order, was still significant ( $p < .005$ ) if only the 21 completely correct value pairs were considered. Of the 16 subjects, 14 performed better on value than fact tasks, none did the opposite, and two performed equally on both tasks ( $p < .001$  by Sign Test). The order effect, which we will not try to interpret, took the form of subjects who had fact tasks first performing better—especially on fact tasks—than subjects who had value tasks first.

It is clear, then, that the results of this study replicate those of Study 1. Even though the second experimenter's preferences and knowledge were explicitly stated, and even though the two types of tasks were given quite similar affective properties, young 3-year-olds were significantly better at inferring her value beliefs than her fact beliefs.

## Study 3

Although similar in its basic aim, this study differed from Studies 1 and 2 in five ways. First, we attempted in this study to make both fact and value tasks very easy—and equally so—by greatly reducing their inferential demands. In Study 2, the first experimenter reduced these demands by telling the children what Ellie, the second experimenter, knew and liked before asking them what she believed. In this study we virtually eliminated all inferential demands by having Ellie actually say what she believed on each task before asking the children what she believed; thus, the children had only to echo what Ellie had just said in order to be correct. Second, in Study 2 we attempted to equate fact and value tasks by having Ellie engage in similar behaviors and express similar affects in both tasks. In this study, we attempted to equate them by the opposite route of having Ellie avoid giving any behavioral and affective clues to her beliefs. Third, unlike in the previous studies, the beliefs that she voiced were disinterested ones that were not accompanied by a goal of

obtaining or avoiding the objects that the beliefs were about. This was meant to decrease the likelihood that on fact tasks, subjects might report what was really the case rather than what Ellie erroneously believed to be the case, simply to help her achieve her goal by telling her the true facts. We also tried to block any such strategy by stressing in fact tasks that Ellie was not to see or be told about the hidden object (see Procedure). Fourth, the value beliefs concerned whether a stimulus was visually pretty or not, rather than how it tasted or smelled. In contrast to the previous value tasks involving taste and smell, in the Study 3 value tasks subjects continued to see the stimulus and thus perceive its attractiveness-unattractiveness while being asked for Ellie's aesthetic judgment of it (which was always the opposite of their own). Inasmuch as they also continued to perceive the reality on fact tasks when asked for Ellie's belief, this served to further equate the two tasks. Finally, just out of curiosity, we added at the end of each testing session two "hybrid" tasks that had features of both fact and value tasks. As in the fact tasks, Ellie had no perceptual access to the target object in these hybrid tasks. As in the value tasks, however, her belief concerned whether or not the object was pretty. The result was a task that was fact-belief-like in structure (Ellie harbored a false belief about an object because she had not seen it) but value-belief-like in content (what she believed about the object was that it was or was not pretty). We had no hypothesis as to the difficulty level of these hybrid tasks relative to those of the fact and value tasks.

## METHOD

### Subjects

The subjects were 20 nursery school children (11 girls, nine boys) from the same preschool used in Studies 1 and 2. None of the children participated in Studies 1 and 2. They ranged in age from 2;10 to 3;6, with a mean of 3;2. One additional child refused to complete the procedure, and two others were disqualified from participation because of attentional limitations.

### Procedure

Each subject was given two value-belief tasks, two fact-belief tasks, and two hybrid value-belief tasks. The hybrid tasks were always given last. Half of the subjects received value tasks before fact tasks, and half the reverse. The orders of individual tasks within each task type were also counterbalanced. Task orders were constructed for each subject so as to be identical for an individual subject

across the three task types, in that if the very first task he or she received was a color task, a color task was always given first on the remaining two blocks of trials. As in the previous studies, each subject was first given experience with a Level 1 perspective-taking task. A brief preamble then introduced each block of trials. Prior to the value tasks, the subject was simply told: "I have some things to show to you and to Ellie." Prior to the fact tasks, the experimenter said: "This time I will show you some things but we won't show them to Ellie. After the game is all over we will let her look. Would you mind going outside for just a minute Ellie? I'm going to use this cardboard wall so Ellie can't see what I show you. Remember, don't say anything about what we have behind our wall, okay?" Prior to the hybrid tasks, the experimenter simply said: "Now I'm going to show you some things but we won't show them to Ellie. After the game is all over we will let her look." Ellie was then asked to leave the room.

*Value tasks.*—In an attempt to anchor the child's own view, he or she was first presented with pairs of stimuli (colors or fake flowers) and asked to indicate the one he thought was pretty and the one he thought was not pretty. These initial stimuli for the flower task were a yellow chrysanthemum-like flower and a flower with small pink petals surrounding a yellowish-green center. The stimulus selected as pretty, usually the chrysanthemum, became the stimulus for the task. The initial stimuli for the color task were blue and pale yellow rectangular color patches created by affixing color filters to white paper. The stimulus chosen as not pretty, usually the pale yellow patch, became the stimulus for the task. The procedure will be illustrated for the flower task. The experimenter said: "I'm going to show you two flowers. Which flower do you think is pretty? Which flower do you think is not pretty? [The flower thought not pretty was removed.] Okay, so this one is pretty. I think this is a pretty flower too. We both think this flower is pretty. Let's ask Ellie. Ellie do you think this is a pretty flower?" Ellie responded in a nonemotional, matter-of-fact tone: "I can see the flower. Hmmm. I don't think it is a pretty flower. I think the flower is not pretty." The experimenter then whispered the following test questions, always asking first for the subject's point of view: "Remember when we saw this flower a minute ago. Did you think this was a pretty flower?" and then "How about Ellie? She can see this flower. Does she think this is a pretty flower?" If the child was incorrect on his or



her point of view, the experimenter asked as a final question: "Remember when I saw this flower a minute ago. Did I think it was a pretty flower?" One subject was incorrect on his point of view on the flower task, and four subjects were similarly incorrect on the color task. Contrary to the results of Study 2, when these subjects were subsequently probed for the first experimenter's point of view, they remained incorrect. The color task was structurally parallel to the flower task, but as previously mentioned, the stimulus used was the one the child thought not pretty. Ellie's explicit value-belief statement was: "I can see the color. Hmm. I think it is a pretty color. I think the color is pretty." The test questions were always phrased in the form of the positive dimension, for example, "Did you think this was a pretty color . . . ?" Thus, to be correct the child had to say "no" to the question about his or her own view on the color task and "yes" to the question about his or her own view on the flower task.

**Fact tasks.**—On the color task, the child was presented with a white cup and a blue cup and asked to choose which one he or she thought was white and which not white. The test stimulus became the blue cup. On the flower task, a large construction paper cut-out of a yellow flower, 27 cm tall and 17 cm in diameter, was mounted on white paper. Its comparison was a small purple flower, 8 cm tall and 3.2 cm in diameter, also mounted on white paper. The child was asked to choose the one he or she thought was big and the one thought not big. The test stimulus was the big flower. A cardboard screen was used to obscure the object from Ellie's view. The procedure is illustrated for the color task. While Ellie was out of the room, the experimenter said: "I'm going to show you two cups. Which cup do you think is white? Which cup do you think is not white? [The white cup was removed.] Okay, so this one isn't white. I don't think this is a white cup either. We both think this cup is not white. Let's put this cardboard wall up so Ellie can't see this cup. Ellie, you can come in now." As Ellie returned, the experimenter whispered to the child: "Remember, let's not tell Ellie about the cup we have over here." Ellie sat opposite the child and the barrier was tilted over the cup such that the child could see both the cup and Ellie but the cup was not visible to Ellie. The experimenter continued: "Let's ask Ellie. Ellie, we have a cup over here. Do you think we have a white cup over here?" Ellie replied: "I can't see the cup. Hmm. I think you have a white cup over there. I think you have a cup that is

white." (Notice that what Ellie expressed here was, from an adult's perspective, a wrong guess rather than a false belief resulting from deception, inasmuch as she had not previously seen a cup of either color behind the screen.) The whispered test questions were: "Do you think we have a white cup over here?" and "How about Ellie? She can't see this cup. Does she think we have a white cup over here?" The flower task was identically structured. Ellie's false belief statement was "I can't see the flower. Hmm. I don't think you have a big flower over there. I think you have a flower that is not big." The ensuing test questions concerned whether the child and Ellie thought a big flower was present. One child erred on his own view on the flower task, and a second child erred on his own view on the color task.

**Hybrid tasks.**—The initial stimuli for the color task were red and gray color patches, and the stimulus retained for the task was the color chosen as pretty. All subjects chose the red color. For the flower task, a fake pink rose was paired with a sprig of dried flowers. The dried flower was chosen as not pretty by all the subjects and retained as the test stimulus. The only difference in structure between these hybrid tasks and the fact tasks concerned the use of value words in the child's choice of objects, Ellie's belief statements, and the test questions posed to the subject. After Ellie returned to the room she was asked, for example, if she thought we had a pretty flower over here. Her statement was: "I can't see the flower. Hmm. I think you have a pretty flower over there. I think you have a flower that is pretty." Her statement on the color task was: "I can't see the color. Hmm. I don't think you have a pretty color over there. I think you have a color that is not pretty." The test questions were worded identically to those used in the fact tasks: "Do you think we have a pretty color [flower] over here?" and "How about Ellie? She can't see this color [flower]. Does she think we have a pretty color [flower] over here?" If the child missed his or her own view (one child did so on the color task and another child did so on the flower task) the question was asked concerning the first experimenter's view. One of the children was subsequently correct, the other was not.

## RESULTS

As in the previous two studies, the response measure analyzed was the number of pairs of questions correctly answered (range 0–2), with each pair consisting of a query

about the child's and Ellie's beliefs. The fact and value tasks were analyzed separately from the hybrid tasks. A 2 (type of task—fact vs. value)  $\times$  2 (order of task type) analysis of variance showed a significant main effect only for type of task,  $F(1,18) = 6.70, p < .02$ . The percentages of correct pairs were 53% for value beliefs and 33% for fact beliefs (see Table 1). Of the 20 subjects, eight performed better on value tasks, one better on fact tasks, and 11 equally on both ( $p < .05$  by Sign Test). The percentage of correct pairs for the hybrid tasks was 50%, similar to the value tasks' percentage but significantly higher than that of the fact tasks,  $t(19) = 2.67, p < .02$ . Of the 20 subjects, six performed better on hybrid tasks than on fact tasks, none did the opposite, and 14 performed equally on both ( $p < .05$  by Sign Test).

The results of this study corroborate those of the preceding two. Although the procedure of this study differed from those of its predecessors in the five ways noted in its introduction, young 3-year-olds still found value tasks significantly easier than fact tasks. In fact, the hybrid task data suggest that the mere presence of evaluative content in a belief task can make that task easier for them.

#### Study 4

Previous studies have shown that 3-year-olds have two related problems with false fact beliefs. One, already described, is that they tend to attribute a true belief rather than a false belief to another person, even when given very strong evidence that the person holds the false one. The other is that, when told that the person holds the false belief and then asked to predict the person's behavior, they tend to predict that the person will behave in accordance with the true belief rather than the false one (Harris, Johnson, & Harris, 1988; Wellman & Bartsch, 1988). For example, if shown that an object is hidden in location A and told that another person believes it to be in location B, 3-year-olds are likely to predict that the person will search for the object in A rather than B (Wellman & Bartsch, 1988). This provides additional evidence that they do not understand false beliefs, because knowing that people will act in accordance with their false beliefs rather than reality is part of what it means to understand false beliefs.

Studies 1–3 have shown that 3-year-olds have more of the first problem when dealing with false fact beliefs than when dealing with odd value beliefs. The purpose of Study 4 was

to test the hypothesis that they would also have more of the second. Three-year-olds were told another person's fact and value beliefs and then asked what the person would do. If they really understand value beliefs better than fact beliefs, as Studies 1–3 suggest, they should be better at predicting what actions would follow from value beliefs than would follow from fact beliefs.

#### METHOD

##### Subjects

The subjects were 32 nursery school children (17 girls, 15 boys) from the same preschool used in the preceding three studies. None of the children participated in Studies 1–3. They ranged in age from 2;11 to 3;8, with a mean of 3;3. Three additional children were tested but could not be retained as subjects for various reasons.

##### Procedure

As in the previous studies, each subject was given two value-belief tasks and two fact-belief tasks. The task structure and wording of questions in the two types of tasks were made as similar as possible. Half of the subjects received the two value tasks before the two fact tasks, and half the reverse. Orders of individual tasks within each task type were also counterbalanced.

*Value tasks.*—The following are the highlights of one of the value tasks. With the second experimenter (Ellie) out of the room, the child was presented with a big colorful flower and a little, drab, dried flower and asked which one he or she thought looked pretty and which one not pretty. As expected, all of the children thought the big one was pretty and the little one not pretty. After agreeing with the child's judgments, the experimenter called Ellie back into the room and asked her the same questions. Ellie made the opposite judgment about each flower. For example, she said of the big flower: "I think this one doesn't look pretty—it doesn't look pretty." She then left the room again. The child was next asked again whether he or she thought the big flower looked pretty. The experimenter then said: "Okay, you think this flower *does* look pretty. How about Ellie? Does Ellie think this flower looks pretty? That's right [or "Actually," if the child erred], *she* thinks this flower *doesn't* look pretty. Ellie thinks this flower *doesn't* look pretty and you and I think this flower *does* look pretty." (The order of the two clauses in this last sentence was counterbalanced.) After thus repeating the two opposing beliefs, the experi-

menter asked the critical question about Ellie's behavior: "Ellie can choose just one flower to keep. Which flower will she choose to take home and keep?" followed by "Why will she choose this one?" The other value task was the same except that the stimuli were foods that did (a goldfish cracker) and did not (a dark, dried-up apricot) look yummy tasting to the subjects, with Ellie making the opposite judgments. The child was asked to predict which food Ellie will choose to take a bite from. Five children thought the apricot looked yummy tasting; for these children we substituted a different unattractive food, for example, a dried-up passion fruit.

**Fact tasks.**—The sequence of events was the same in these two tasks as in the value tasks. One of them began with the child seeing that a toothbrush box contained a toothbrush and that a lightbulb box was empty by looking through windows cut in the back of the boxes. Each box displayed a picture of its usual contents. The experimenter then said: "Okay, we both think that this box has the toothbrush and this box doesn't have the toothbrush. Ellie can't see inside the boxes like we can. She doesn't know where the toothbrush is. Let's keep it a secret, okay?" [Ellie enters.] Oh, she's got some toothpaste with her. Let's ask her what she thinks about these boxes. Ellie, which box do you think has the toothbrush inside?" The contents of the boxes remained visible to the child throughout the task but were never visible to Ellie. Ellie replied: "I think this box [the lightbulb box] has the toothbrush inside. It looks like the kind of box that would have a toothbrush." After similarly judging that the toothbrush box did not contain a toothbrush, she again left the room. The child was then asked whether he or she thought the toothbrush box contained the toothbrush, and whether Ellie did, with the experimenter stating the correct answer following each question. Following this the experimenter first repeated the child's and Ellie's opposing beliefs about the contents of the toothbrush box and then asked the behavior question: "Ellie can choose just one of these boxes to open to look for the toothbrush. Which box will she choose to open?" followed by "Why will she choose this one?" In the other fact task, the feet of a Mr. Potato Head toy were hidden in the box the toy came in; the other box displayed a picture of a bell, but was empty. Note that we tried to make Ellie's perceptual judgments be as eccentric in the fact tasks as they were in the value tasks; witness, for example, her judgment that the lightbulb

box did and the toothbrush box did not look like it contained a toothbrush, contrary to the pictures displayed on each box.

## RESULTS

The response of primary interest in this study was the subject's prediction of what Ellie would do, that is, whether she would behave in accordance with her stated belief (correct prediction) or in accordance with the subject's and experimenter's beliefs (incorrect prediction). A 2 (type of task—value vs. fact)  $\times$  2 (order of task type) analysis of variance of these responses revealed as its only significant effect a main effect for type of task,  $F(1,30) = 16.58, p < .001$ . Consistent with our hypothesis, subjects were significantly better at predicting Ellie's behavior from her stated value belief (91% correct predictions) than from her stated fact belief (58% correct predictions). Of the 32 subjects, 16 were better on value predictions, two were better on fact predictions, and 14 performed equally on both ( $p < .002$  by Sign Test). The subjects performed about equally well on the two value tasks and about equally poorly on the two fact tasks.

Recall that, in each task, as soon as Ellie had stated her belief and left the room, the subject was first asked for his or her own belief and then for Ellie's, with the experimenter restating the correct answer to each question after the child had answered. Subjects were always correct in reiterating their own belief but sometimes erred in reporting Ellie's. One would expect from Study 3 that they would err more when reporting her fact beliefs than when reporting her value beliefs. This was in fact the case on subjects' very first task, prior to any restatement by the experimenter: 14 of the 16 subjects (87%) whose first task was a value task correctly reported Ellie's value belief on that task, whereas only seven of the 16 (44%) who experienced a fact task first correctly reported her fact belief on that task,  $\chi^2(1) = 6.79, p < .01$ . There were no appreciable fact-value differences in accuracy of report on subsequent tasks, however; accuracy rates over all tasks were 80% for value tasks and 73% for fact tasks. The experimenter's repeated restatements of Ellie's belief on task after task may have been partly responsible for this attenuation of the initial difference.

There were two other findings indicating a poorer comprehension of fact beliefs than value beliefs. First, only 66% of the children's correct fact-belief attributions were followed

by correct behavior predictions, in contrast to 90% of their correct value-belief attributions. This suggests that a number of even their correct fact-belief attributions did not reflect a genuine understanding of false fact beliefs. Second, only 24% of subjects' correct behavioral predictions on fact tasks were adequately justified, in response to the "Why will Ellie choose this one?" question, by reference to what Ellie thought, or did not know or see. In contrast, 54% of their correct predictions on value tasks were adequately justified by mentioning what she thought, liked, or wanted. This suggests that even their correct predictions on fact tasks were often not arrived at by considering what she believed. Such results, considered together with the simplicity of the tasks and the very considerable help provided to the subjects by the experimenters, make us think that the children's 58% correct predictions on the fact tasks represent, if anything, an overestimate of their understanding of false fact beliefs.

Finally, although the two experimenters repeatedly used the belief word "thinks" in these tasks, they never used the preference or desire word "likes." Nevertheless, when justifying their correct behavior predictions on value tasks, only six subjects used "thinks," whereas 13 used "likes." This raises the possibility that young children may find value-belief statements relatively easy to understand because they spontaneously translate them into statements of preference or desire.

## General Discussion

The consistent finding in all four studies was that young 3-year-olds performed very poorly on fact-belief tasks but fairly well on value-belief tasks. This difference in performance held when several different kinds of fact and value tasks were compared and when the two types of tasks were closely equated on other task variables.

The children's poor performance on the fact-belief tasks was very striking in view of all the help they were given. Recall that in Studies 1 and 2 the second experimenter gave very strong behavioral evidence of her false belief, and in Studies 3 and 4 she actually stated it outright. Despite this massive assistance, the children usually attributed a true fact belief to her rather than a false one (Studies 1-3), and often failed to predict that she would act in accordance with her false belief (Study 4). These results are nevertheless consistent with most previous studies which, as noted in the introduction, portray the young

3-year-old as having an inadequate understanding of what it means to have a false belief, and thus perhaps of what it means to hold a fact-type belief of any kind. Although this negative portrayal represents the majority view, not everyone endorses it. Chandler et al. (1989) have colorfully characterized the recent argument between those who think 3-year-olds do really understand what it means to hold a fact belief (e.g., Chandler et al., 1989; Wellman & Bartsch, 1989) and those who do not (e.g., Perner, in press) as a dispute between "boosters" and "scoffers." As long as young 3-year-olds continue to attribute a true fact belief to another person after the person has openly subscribed to a false one, and to predict that the person will behave in accordance with that true belief, we will have to side with the scoffers in this dispute.

The children's good performance on the value-belief tasks seemed even more remarkable than their poor performance on the fact-belief tasks. Experimental demonstrations of any sort of conceptual perspective taking in young 3-year-olds are rare in the literature on cognitive development. It was therefore surprising to see children this young correctly attributing to another person beliefs very different from their own about how things tasted, smelled, and looked, and also recognizing that the person would act in accordance with these value beliefs. Why did the children find the value-belief tasks easier than the fact-belief ones?

One possibility is that children's good performance on the value-belief tasks is indicative of a fundamentally correct conception of beliefs and that, as Chandler et al. (1989) have argued, methodological problems in standard fact-belief tasks prevent children from displaying their true competence on those tasks. For the reasons given above, however, we think this explanation unlikely. We went to great lengths to make the fact-belief tasks not only easy but also closely equated with the value tasks. Note, for instance, that the syntactic form of the test questions was identical for both kinds of task, and that the cues to the other's belief were either very closely matched (Studies 1 and 2) or identical (Studies 3 and 4). The relative difficulty of the fact versus value tasks seems much more likely to stem from substantive rather than methodological factors.

A second possibility is that, in the fact-belief tasks more than in the value-belief tasks, the children's own perspective was more salient for them than the second experi-

menter's, or was experienced as more certain, more clearly the only possible right answer. Recent research suggests that the certainty or salience of the competing beliefs can affect children's performance on belief tasks. Perner (1988) has argued that children's difficulties on standard false-belief tasks result from an inability to recognize that someone might take as true a model of reality that is clearly and definitely false. Wellman and Bartsch (1988) found that children perform well on fact-belief tasks in which there was some uncertainty about the reality. Specifically, when the location of an object was unknown, or when the object could be found in more than one location, their subjects were able to take a protagonist's belief into account in predicting where he or she would look for the object. Similarly, Zaitchik (1989) has evidence suggesting that 3-year-olds may perform better on fact-belief tasks when the certainty or salience of the reality is reduced. In her study, when children were merely told about the true state of affairs, as opposed to directly perceiving it, they were more willing to attribute a belief to another that deviated from reality. The data from the current study do not provide clear evidence as to whether these factors may have contributed to the differential difficulty of the two types of tasks. For example, we do not know whether children succeeding on our value tasks considered—or even needed to consider—issues of correctness or truth when solving them. A related possibility is that they have simply learned that people sometimes disagree about how things taste, smell, and look, and that this knowledge made it easier for them to credit the second experimenter with an opinion different from their own on these matters. Whether they also sense that there need be no definite right or wrong in such differences of opinion is not known, but would be worth trying to find out.

A final possibility, which we favor, relates to the reasons given at the beginning of this article. In particular, we think children may have spontaneously interpreted the value-belief questions as requesting the other person's desires or likes-dislikes with respect to the target object, rather than requesting her mental model or representation of it. That is, the children may have somehow construed them more as desire or preference questions than as belief questions, even though they clearly were worded as belief questions. If, as many now think, children of this age understand desires better than beliefs, then interpreting value-belief questions as desire ques-

tions should certainly have made them easier. Two of our results support this possibility. The first was the finding in Study 1 that 3-year-olds could correctly answer questions about whether Ellie liked or disliked the stimulus. The second, and stronger piece of evidence was subjects' tendency in the Study 4 value tasks to justify their predictions of Ellie's behavior by referring to what she "likes," even though they had previously been told only what she "thinks"—never what she "likes."

The results of these studies suggest that children understand quite early that other people can have different preferences and opinions than they do, and will act in accordance with them. Additional research will now be needed to discover when and how they develop related notions. For example, when do they acquire the concept of an enduring preference or attitude, stable over time, as distinguished from a momentary like or dislike? Similarly, when and how do they acquire various intuitions about how positive and negative attitudes toward people, objects, and events are formed? At what age, for instance, do children discover that positive and negative experiences with things generally tend to engender, respectively, positive and negative attitudes toward those things? Wimmer and colleagues (Wimmer, Hogrefe, & Sodian, 1988) have recently raised the important question of when and how children understand the role of experience in the formation of factual knowledge and beliefs. We suggest that the same question can now be addressed with respect to the establishment or modification of value beliefs.

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